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Vegetative Propagation of Alder (Alnus glutinosa L.) by Rooted Cuttings

by

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Alder (Alnus B. Ehrh.) species possess several desired characteristics for short rotation, biomass plantations. They grow rapidly and are easy to establish in plantations. After logging, they regenerate by sprouting. In addition alder species can fix nitrogen and improve soil fertility. For these reasons, the genetic improvement of alder for biomass plantations is becoming of increasing importance.

Cloning of alder selections and hybrids would be advantageous for the fast development of genetically improved varieties. A practical way is to propagate by cuttings, but, unfortunately, the information on rooting alder cuttings is scanty and inconclusive (Alden et al. 1977, Bialobok 1980).

Trials were initiated at the Ontario Tree Improvement and Forest Biomass Institute, Maple to provide information and experience on rooting alder cuttings. The results of 2 trials with European (black) alder (Alnus glutinosa L. Gaertn) cuttings established in experimental greenhouses are described in this Research Note.

Materials and Methods

Trial no. 1 was established with lignified cuttings in a flushing stage, collected 21 April, 1981 from five 20- to 25-year-old trees grown at Maple Arboretum. The cuttings (10-16 cm long) were of last year's growth from epicormic branches and branch terminals. The cuttings from different trees were bulked. They were dipped into a rooting hormone powder (Seradix #2, May and Baker Ltd., Montreal, Quebec) and planted vertically into a rooting media up to the top bud. Various rooting media were used: commercial, medium grade perlite and vermiculite; commercial sphagnum peat moss; washed coarse sand; acid peat from Swastika (Boreal Ontario) peat bog stored for 1 year; and hardwood sawdust from a Southern Ontario Sawmill. Forty two cuttings were planted in each medium into cone-shaped plastic tubes (Ray Leach Containers, Canby, Oregon, U.S.A.), which were 4.0 cm in diameter and 21 cm long, placed in plastic trays, holding 98 tubes each in free-hanging arrangement. The trays were placed on open benches in a cool,

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shaded area inside a small room-size plastic covered greenhouse with air conditioning (15-18°C). After planting, the cuttings were watered with Orthocide 50 wettable 50% Captan solution (1 tablespoon per 4.6 L of water). The rooting media were kept fresh, but not water-saturated, by hand misting. The cuttings were examined for rooting 10 weeks after planting.

Trial no. 2 was established with cuttings from actively growing green stems taken from new sprouts of decapitated, one year old seedlings. The cuttings were taken 1 June, 1981 and were approximately 10 cm in length with at least two well developed leaves. The stems were in a semi-lignified stage. Ten seedlings were used in the trial and from 4 to 11 cuttings were collected from each seedling. The identity of the ortets and ramets was maintained. The cuttings were dipped into Seradix #2 rooting hormone and planted vertically to a depth of approximately 3 cm in the rooting medium. The containers were 3 x 3 cm green plastic pots filled with equal parts of perlite and sand. These were placed inside a 0.91 x 1.82 x 0.72 m tent, made of a plastic wood frame covered with 4 mil transparent plastic, and standing on an elevated metal bench in a greenhouse. The conditions inside the tent were as follows: humidity approximately 70-80% and temperature 15-22°C. The rooting medium was kept fresh by hand misting, never allowing the leaves on cuttings to droop. The rooting was checked by examining the roots on each cutting 4 weeks after planting.

Results

Lignified cuttings (in trial no. 1) rooted in all mixtures, except in peat and perlite. Best rooting occurred in mixtures of sand and perlite, and sand, perlite and sawdust (64% and 60% rooting, respectively). The rooting in hardwood sawdust was 43%, in mixture of vermiculite, peat moss and sawdust 45%, and vermiculite and peat moss 23%. The latter mixture resulted in poorest root development as well. Most roots developed from the callus at the bottom of the cuttings, and occasional roots developed along the cuttings (Fig. 1).

Green, semi-lignified cuttings (in trial no. 2) rooted sooner than lignified cuttings. Cuttings from all ortets rooted, and the rooting by ortets varied from 60% to 100%. All roots developed from the callus at the bottom of the cuttings (Fig. 2).

Conclusions

Lignified cuttings of European alder taken from 20- to 25-year-old trees, and green cuttings of the same species taken from 2-year-old seedlings rooted readily. An equal mixture of perlite and sand was a good rooting medium. These trials proved that cuttings of European alder can be rooted without difficulty in greenhouse conditions. Thus cloning of European alder by rooting cuttings can become feasible.

Figure 1. Rooted lignified cuttings of Alnus glutinosa

Figure 2. Rooted unlignified (green) cuttings of Alnus glutinosa

References

Alden, T., I. Dormling and C. Ehrenberg. 1977. Some methods for vegetative propagation. In: Vegetative propagation of forest trees - physiology and practice. Lectures from a Symp. in Uppsala, Sweden, 16-17 Feb. 1977. Univ. Agr. Sci., Sweden, p. 133-147.

Bialobok, S. (Ed.) 1980. Olsze (Alnus Mill). Polish Academy of Sciences, Institute of Dendrology, Kornik Publ. 350 p. (In Polish with English summaries)